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ABSTRACT

A slide/tape self-instructional package was developed to be used to teach instructional skills in medical technology courses. Although medical technologists need to obtain these skills in order to function effectively in internship programs and employee training, they do not have the time for their inclusion in the standard curriculum. An audiovisual self-instructional course was recognized as the solution because it can be administered by the students at their own pace and convenience and still provide effective training. To determine if such a course would be acceptable to medical technologists, a survey was conducted of 200 university and hospital programs nationwide. The 126 respondents generally agreed with the need for such a course and were receptive to an audiovisual format. A literature review showed that a competency-based teaching method would be an effective instructional skill for medical technologists to master. The course which was then developed consisted of 150 slides and accompanying statements to explain the use of goals and performance objectives in teaching. Further work is still required to field test its effectiveness and make necessary revisions. (Copies of the survey questions and the audiovisual script are included.) (ELG)

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EDUCATION FOR EDUCATORS IN MEDICAL TECHNOLOGY

by

Thomas Hans Olson MT (ASCP)

An abstract of a thesis submitted in
partial fulfillment of the requirements
for the degree of

Master of Science
Instruction and Administration
in Medical Technology

in

The School of Graduate Studies
of
University of Wisconsin-Eau Claire

May

1977

CE 019 102

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EDUCATION FOR EDUCATORS IN MEDICAL TECHNOLOGY

by

Thomas Hans Olson MT (ASCP)

Pursuant to

Master of Science

Instruction and Administration
in Medical Technology

Approved: Carol L. Kluh
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Date of Approval: May 5, 1977

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Education for Educators in Medical Technology

As the field of medical technology expands to include new ideas and techniques, the medical technologist must also become more knowledgeable. As this necessary information grows, students of this profession are forced to play a more active part in their learning experience. Since time management is very important in the clinical portion of the student's education, it becomes especially important that instructors understand and practice effective instructional skills.

A questionnaire was sent to 100 hospital programs and 100 university programs in the United States to ascertain current attitudes, opinions and practices of instructional skills training in medical technology curricula. The questionnaire was mailed to the Educational Coordinator or Program Director of the respective programs. It was determined from the responses that:

1. There is general agreement that instructional skills training is necessary for medical technology students.
2. Only 35 percent of the surveyed institutions are now providing some form of instructional skills training.
3. One of the main reasons for it not being included in the remaining 65 percent is lack of course time.
4. A slide/tape unit would be an acceptable way of receiving instructional skills training.

As a consequence of these responses, a slide/tape package was developed on the use of goal analysis for curriculum development and includes detailed explanations of goals and behavioral objectives.

Numerous examples geared to the medical technology profession are used to demonstrate good techniques in performing goal analysis, writing worthwhile objectives, and evaluating these objectives to ensure that learner will be able to utilize these objectives in his learning process. Objectives were also differentiated on the basis of Bloom's Taxonomy and several examples of each level were provided.

At this time the script for 151 slides has been prepared and can be found in Chapter 5. A description of probable content for each of the slides accompanies the script.

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Chapter 1

INTRODUCTION

Introduction to the Problem

The field of Medical Technology is growing at an ever increasing rate. This tremendous growth is creating an abundance of new material which should be included in the course of study of medical technology students during their internship year. As more and more information is being crowded into this confined internship period it becomes increasingly more evident that wise management of time and information is important to the success of medical technology students in their chosen profession.

Statement of the Problem

In recent years it has been recognized that instructional training skills for medical technologists is necessary to attain the most effective course of study for students undertaking their internship year. On the other hand, it is generally felt that course time is too valuable to spend on teaching instructional skills when there is such an influx of new information which must be learned by the student.

These opposing views constitute the problem. A majority of medical technology students from past years have not received training in instructional skills and are subsequently not adequately prepared to play an active role in the

11 A

educational process. Yet many of these individuals step into positions where they are required to instruct students in medical technology, medical laboratory technician, and clinical laboratory assistant programs and/or new employees. Past experience of this writer has shown this to be true.

Several factors warrant the inclusion of instructional skills training for medical technologists. NAACLS now requires the use of properly written, meaningful educational objectives for medical technology, medical laboratory technician and clinical laboratory assistant programs. This is evident in the 1975-76 Essentials for Accreditation of Schools of Medical Technology.

Another reason for instructional skills training involves the lack of preparedness of people in the field. In a survey of hospital medical technology programs only 37 percent of the clinical laboratory instructors had any type of instructional training.

With the increasing amount of information which must be learned by the student during the internship year, effective, efficient instruction becomes a necessity. A slide/tape self-instructional package can be both effective and efficient. Instruction by means of such units is consistent, patient, continually dynamic, and correct. The learning experience is active. Self-instruction provides for individual differences in aptitude allowing the learner to compete with himself rather than others. Time does not have the same bearing on a self-instructional unit that it does on didactic material. Students should be allowed to

use such a unit at the time most suited for each to learn. Furthermore, a self-instructional package is available for reuse at any time and for as many times as is necessary to learn the material. In this way didactic material need not suffer for the sake of instructional skills training.

Purpose of the Study

A questionnaire was sent to medical technology educators across the United States in order to determine the extent of instructional skills training included in medical technology programs. This was done in order to establish whether or not there was a need for an alternative method of learning instructional skills.

Limitations

The limitations for this study are:

1. The response rate,
2. The correct interpretation of the question,
3. The accuracy of the responses, and
4. The delivery rate of the questionnaires to the participants of the survey.

Delimitations

The delimitations for this study are:

1. The scope of the study,
2. The time period involved,
3. The geographic location,
4. The size of the survey, and
5. The random selection of hospitals and universities.

Definition of Terms

In order to better understand this paper, the following terms have been defined:

1. Instructional skills: methods and concepts which enable the instructor to help the student to learn.
2. Hospital program: any School of Medical Technology located in a hospital.
3. University program: any medical technology program conducted at a university college, junior college, or other institution of higher learning.
4. Slide/tape package: any 35mm color slide/ cassette tape combination used for simultaneous audio and visual presentation of a subject.

Chapter 2

LITERATURE REVIEW

The concept of instructional training for medical technologists has been found to be seriously lacking in hospital schools and institutions of higher learning across the country despite the fact that the overwhelming majority of the educational coordinators and program directors in these schools see this training as being a necessary part in the total education of a medical technologist. As demonstrated in the results of the survey, for every school that includes at least some training in instructional concepts, there are two which include no instructional training whatsoever. Those schools which do teach instructional skills for the most part include only a smattering of one or more of the three components--planning, implementing and evaluating instruction and learning. Their desires for concepts to be taught include as one respondent put it, "Some of each".

It is for that reason that this writer has decided to prepare a learning package on Goal Analysis--the breakdown of goals into specific behavioral objectives. Although the practice of delineating goals and objectives into specific useful entities is a relatively new aspect in instructional training, the idea of objectives has been around since primitive times. Popham cites an example of primitive men

teaching their sons how to shape axes from stone. Although nothing was written in terms of learner behavior, these teachers probably knew what they expected of the young. Popham states that their use of objectives may be limited to a "loose desire that the hand axes would be able to cut."[1]

Throughout history there is evidence that educators were concerned with selecting goals and objectives. From pre-Christian educators in Greece and Rome to the early Twentieth Century educators such as Frederich Burk, Franklin Bobbitt and Carleton Washburne, there have been periods of concern over the specification of educational objectives, but these have been the exception rather than the rule. Popham writes, ". . . American educators have generally engaged in the same level of discourse regarding the specification of educational goals that one might derive from the grunts of a Neanderthal."[2]

"A typical reaction to behavioral objectives is illustrated by the remarks of a professor who discovered the mimeographed handouts of objectives in an audio-tutorial learning center, 'What's this?' she said in a shocked voice. 'Objectives!' 'You don't let the students see these do you?' 'Yes.' 'My goodness, they will learn it all!'"[3]

It has only been during the 1950's and '60's that instruction by objective has gotten off the ground. Curriculum writers during this period were influenced by such people as Ralph Tyler and Benjamin S. Bloom.

Tyler in 1950 wrote a monograph urging that instruc-

tional objectives be written in terms of the learner. This is opposed to teacher oriented objectives which had been used previously.

In 1956 Bloom compiled his Taxonomy of Educational Objectives.[4] In it he delineated the cognitive domain into a hierarchy of six categories of levels (Figure 1). Bloom's Taxonomy has been a major impetus for the use of specific behavioral objectives. Popham feels, "that this volume probably proved the nature of instructional goals more intensively than any document previously written in this country."[5]

There have been several attempts at reaching a satisfactory definition of what is meant by goals and objectives. Goodlad in 1966 differentiates between aims (goals) and objectives. He describes educational aims as a "remote end for the guidance of educational activity", while defining an educational objective as "a statement of what students ought to know, be able to do, prefer or believe as a consequence of instruction."[6]

In 1970 the California state legislature defined the terms for the purpose of curriculum development in education.

"Goals: Statements of broad direction or intent which are general and timeless; not concerned with a particular achievement within a specified time period. Goals are:

1. Designed to provide broad general directions for education.

Figure 1

MAJOR LEVELS IN THE COGNITIVE DOMAIN

Knowledge	As the lowest level of learning outcomes in the cognitive domain, knowledge involves the recall of specific facts as would be learned by rote memorization.
Comprehension	Comprehension, the lowest level of understanding, involves the ability to find meaning in material as evidenced by the ability to translate material to different forms, interpret material or estimate future trends.
Application	Application is the ability to use learned material such as rules or concepts in new and concrete situations.
Analysis	Analysis involves the breakdown of material into its component parts in order to understand the organizational structure.
Synthesis	Synthesis involves the ability to put parts together to form a new whole, such as the formation of speech or research proposal. Creativity is stressed.
Evaluation	Evaluation is the process of making a judgment on the value of material for a given purpose. Value judgments are based on definite criteria.

2. Subject to a variety of interpretations.
3. Intangible, often never fully attained."

"Objectives: An objective is a devised accomplishment that can be verified within a given time and under specifiable conditions which, if attained, advances the system toward a corresponding goal.

Objectives are:

1. Explicit, specific behaviors.
2. Tangible; may be fully attained.
3. Measureable (quantifiable), verifiable.
4. Performance oriented to a large extent.
5. Steps in the achievement of goals; achievement of an objective advances progress toward the goal."[7]

Mager defines a goal as being "a statement describing a broad or abstract intent, state or condition."[8] He defines an instructional objective as "a statement that describes an intended outcome of instruction."[9]

There is little difference among these definitions. They all define goals as being broad, vague generalities while objectives are defined as the narrow, specific

performance which can be accomplished following instruction. In essence, all three definitions point to the idea that objectives are derived from goals. The procedure by which this is undertaken is called goal analysis. A goal analysis is used "to describe the essential elements of abstract states--to identify the main performances that go to make up the meaning of the goal."[10]

These essential elements or performances which Mager speaks of are the roots of the behavioral objective. Behavioral objectives compiled together make up the curriculum.

The use of behavioral objectives is becoming increasingly more important in preparing the curriculum for medical technology students. In 1971 the ASCP Board of Schools in their newsletter encouraged the use of educational objectives as a way of improving the quality of instruction.[11]

In a 1973 issue of Cadence, Annamarie Barros writes, "The laboratory is a business and needs a business approach at all levels. The clinical portion of a student's education should be handled by individuals who have some knowledge of how to teach in addition to their knowledge of what to teach."[12]

In December, 1976, ASMT published the tenth of a series of self-assessment packages. The following statement is from the introduction to this last program: "The Education Self-Assessment reflects a systematic approach to instruction. Exercise items reflect the state of the art

which holds that educative intent should be explicit in objectives."[13]

In summary, goals are broad, vague statements of intent. Goals are undefined and not easily accomplished. Objectives are the narrow, specific performances which once carried out aid in the accomplishment of a corresponding goal. Behaviorally-stated objectives are composed of three parts: learning outcomes, which are the end products of a goal analysis, conditions under which the performance will be carried out, and criteria, the standards for evaluation of the performance.

In essence, goals and objectives make up the curriculum for a course. An objectively written curriculum ensures for higher quality education and better understanding of the course material.

Chapter 3

RESEARCH DESIGN

Before a 35mm slide/cassette tape instructional package could be developed, it was necessary to determine whether or not such a learning package would be of use to the group for which it was intended--namely, those individuals responsible for the instruction of medical technologists. It was determined by the writer that the best method of obtaining this information would be by means of a mailed questionnaire. In this way a large population could be surveyed within a limited amount of time and also, resources to conduct the survey in this manner were available to this writer. The institutions of higher learning to which questionnaires were sent included colleges, junior colleges, and universities (hereafter grouped as universities) which have medical technology programs. The second group was comprised of hospital schools of medical technology. Two hospital schools and two universities were selected from each of the fifty states by the use of random number tables. In cases where less than two hospital schools or universities existed in any state, the balance was randomly selected from the respective group at large. In this way 100 hospital schools and 100 universities were utilized in the survey.

On September 28, 1976, the questionnaires were distributed to the selected hospital schools and universities. Along with the questionnaire was enclosed a letter of introduction, an explanation and a self-addressed stamped envelope. The envelope was provided in order that the respondent could answer conveniently. Copies of the cover letter and questionnaire may be found in the appendix.

The following questions were included on the questionnaire.

1. Your institution is best represented as a(n):
   ___ Hospital School of Medical Technology
   ___ Institution of Higher Learning

This question enabled the writer to compare data received from hospital schools with data received from universities. For example, question number 6 asks whether or not students in the medical technology program are currently being taught any instructional skills. The value of question number one lies in the fact that the writer is able to tell whether or not instructional skills are being taught in a hospital program or university program.

2. This questionnaire is being completed by: (more than one may apply)
   ___ Educational Coordinator
   ___ Staff Technologist
   ___ Administrative Technologist
   ___ Program Director
   ___ University Instructor
   ___ Other (please identify) _____

The writer felt that persons assigned the task of completing the questionnaire may have different levels of experience. The feeling that this variation in position might tend to influence the results in some way prompted

this question.

3. Medical Technologists should receive some training in the planning, implementing, and evaluating of instruction and learning during their undergraduate education.

___ Strongly Agree
___ Agree
___ Disagree
___ Strongly Disagree

IF YOU DO NOT AGREE WITH THE ABOVE STATEMENT, PLEASE CONTINUE WITH QUESTION NO. 5.

This question was included to determine the degree of receptiveness of the respondents with regard to the idea of medical technologists receiving instructional training. Opportunity was given to the respondents to emphasize their response if they so wished by the use of strongly agree and strongly disagree.

4. Concepts in planning, implementing and evaluating instruction and learning should be taught at which level:

___ Institution of Higher Learning
___ Hospital School of Medical Technology
___ Neither
___ Both

For those respondents who answered question 3 affirmatively, this question was designed to inform the writer of their feelings with regard to where such training ought to be included. Provisions were available for those respondents to choose either hospital schools or universities or both, or in some cases neither if they felt that such training should be taught at some place other than the aforementioned levels.

5. Training in the planning, implementing and evaluating concepts should be:

___ Optional
___ Mandatory

This question gave the respondents the chance to

indicate whether or not they thought it was necessary for all medical technologists to receive this training.

6. In this institution students in the Medical Technology Program are now being taught concepts in the planning, implementing and evaluating of instruction and learning.
   ___ Yes
   ___ No

The purpose of this question was to learn whether or not such training was already being instituted in programs across the country.

7. If your answer to question No. 6 was Yes, which of the following instructional skills are included in your Medical Technology Program:

___ Planning Instruction	___ Determining Learning Goals ___ Reducing Learning Goals to Specific Learning Outcomes ___ Writing Clearly Defined Objectives ___ Designing/Selecting Learning Experiences ___ Designing/Selecting Evaluation Devices ___ Planning for Large Group Instruction ___ Planning for Small Group Instruction ___ Planning for Individual Instruction Other: _____
___ Implementing Instruction	___ Applying Learning Principles ___ Interacting with Learners ___ Conducting Large Group Work ___ Conducting Small Group Work ___ Providing Individual Instruction Other: _____
___ Evaluating Learning	___ Gathering Data for Evaluation ___ Organizing Data for Evaluation ___ Analyzing Data for Evaluation ___ Reporting Results

__ Evaluating Instruction
- __ Gathering Data for Evaluation
- __ Organizing Data for Evaluation
- __ Analyzing Data for Evaluation
- __ Reporting Results
- __ Using Results to Modify Instruction

Since planning, implementing and evaluating instruction and learning encompass a variety of performances, this question was designed to indicate to the writer what instructional skills were emphasized in each respondent's program of instructional skills training.

8. Which of the following instructional skills do you feel should be required for Medical Technologists:

__ Planning Instruction
- __ Determining Learning Goals
- __ Reducing Learning Goals to Specific Learning Outcomes
- __ Writing Clearly Defined Objectives
- __ Designing/Selecting Evaluation Devices
- __ Designing/Selecting Learning Experiences
- __ Planning for Large Group Instruction
- __ Planning for Small Group Instruction
- __ Planning for Individual Instruction

Other: _____

__ Implementing Instruction
- __ Applying Learning Principles
- __ Interacting with Learners
- __ Conducting Large Group Work
- __ Conducting Small Group Work
- __ Providing Individual Instruction

Other: _____

__ Evaluating Learning
- __ Gathering Data for Evaluation
- __ Organizing Data for Evaluation
- __ Analyzing Data for Evaluation
- __ Reporting Results

__ Evaluating Instruction
- __ Gathering Data for Evaluation
- __ Organizing Data for Evaluation
- __ Analyzing Data for Evaluation
- __ Reporting Results
- __ Using Results to Modify Instruction

The purpose of this question was to give the respondents the opportunity to choose those instructional skills which they would desire to have in their instructional skills training program.

9. The most practical way for students to receive this training would be:
   ___ Courses through an institution of higher learning
   ___ Courses through a hospital school program
   ___ 35mm slide/cassette tape self-teaching units
   ___ Other: _____

This question was designed to determine what mode(s) of learning would be the most practical for the learning of instructional skills by medical technology students. The response "35mm slide/cassette tape self-teaching units", was included since it is the writer's intention to prepare such a unit if the data received through the questionnaire support the fact that one would be useful in Medical Technology programs. (It should be noted that the writer is aware that this latter response is not equatable with the two former responses and that the latter response is included only to gain additional information.) A space was provided for the respondent to indicate alternative modes of learning if he or she desired.

10. If 35mm slide/cassette tape units were available for use, do you feel that institutions would make use of them:
    ___ Yes
    ___ No

The question was asked to determine whether or not slide/tape units would be used if they were made available. The purpose of this question is to determine specific interest in the development and use of slide/tape units.

11. If your answer to question No. 10 was No, what would be the reason for not using such a unit?
___ Lack of equipment, e.g., a tape player or a slide projector
___ Lack of interest
___ Not necessary for students to know this
___ Other: _____

This question was designed for those respondents who felt that slide/tape units would not be used even if available. The purpose here was to give those respondents the opportunity to express their reason(s) for selecting a negative response to question 10. A few possible reasons were listed as well as a space for their own personal reasons.

The following group of questions (numbers 12-17) were intended for completion only by respondents in hospital schools. These questions pertain to the clinical segment in the total training of medical technologists.

12. Medical Technologists, Medical Laboratory Technicians, and Clinical Laboratory Assistants receive the majority of their hospital training from Medical Technologists.
___ Yes
___ No

It is the opinion of this writer that medical technologists are given major responsibilities in areas of instruction within the clinical setting. It is further believed that medical technologists are responsible for teaching medical technology students as well as medical laboratory technician students and clinical laboratory assistant students. The purpose of this question was to validate these opinions. This would in turn support the

belief (which is based on past experience of this writer) that there is a need for instructional skills training for Medical Technologists.

13. Most Hospital Instructors you know have received some additional training in instructional skills in order to better help their students to learn:
___ Yes
___ No

The writer feels that there is limited involvement in gaining insight into the needs of students with regard to high quality education. This question was included to determine how much interest there has been in improving the quality of education by improving the teaching abilities of those persons responsible for clinical laboratory instruction.

14. Most Hospital Instructors you know have received at least a Master's degree in education or a MSMT degree with a specialization in education:
___ Yes
___ No

Most instructors at the academic level have some type of advanced degree; this is generally a Master's Degree and quite likely a Ph.D. or equivalent. This question was included to determine whether or not teacher preparation for the clinical level is equivalent to teacher preparation for the academic level.

15. Individuals in your Medical Technology Program that have had additional training skills are: (more than one may apply)
___ Educational Coordinator
___ Didactic Instructors (presenters of theory)
___ Bench (practical) Instructors
___ None

This question locates those people in the clinical program who had received additional training.

16. The closest university which would serve your needs for continuing education in instructional skills is:
___ Within your city
___ Within commuting distance
___ Outside commuting distance

One possible reason why clinical instructors are deficient in instructional training skills is lack of access to such instruction. This question was included to determine the proximity of hospital schools to universities which could provide a means of gaining additional training.

17. If your hospital is located away from a university setting, would you be interested in some other means of learning instructional skills:
___ Yes
___ No

The purpose of this question was simply to determine what interest in learning instructional skills was present among those not having immediate access to the university setting.

Those respondents who were interested in receiving a copy of the results of the survey were asked to indicate their name and address. In this way other respondents were able to maintain some degree of anonymity. It was felt by this writer that by giving the respondent the ability to remain anonymous this could possibly increase the response rate.

Throughout the questionnaire the respondent was given the opportunity to make personal comments. A space for a final comment was also provided at the end of the questionnaire. Comments which were made are included in Chapter 5.

Chapter 4

RESULTS

By the proposed deadline date for return of the questionnaires, October 19, 1976, less than 25 percent of the population had responded. Many of these completed questionnaires were received by the writer during the last few days preceding the deadline date. Due to the poor response rate, a follow-up letter was prepared and mailed on October 27, 1976. As a response to this letter, six people wrote back requesting a new questionnaire--indicating that the first one had been lost, discarded, or in most cases had never reached them at all. Secondary questionnaires were immediately dispatched to those who had requested them.

By the final deadline date, November 26, 1976, a total of 63 percent (126 participants) had responded to the survey. The majority of these indicated in the comment section of the questionnaire that they had not received the questionnaire until after the October 19 deadline. The latest date of receipt of the questionnaire indicated was November 8, 1976--nearly six weeks after the questionnaire had been mailed.

Of the 126 responding, five did not complete the questionnaire as they no longer have a medical technology

program. Of the remaining 121 participants, 60 were from hospital schools of Medical Technology and 61 were from universities. The data found in Tables 1-13 is based on these 121 responses.

From Table 1, it can be ascertained that the general consensus is in favor of instructional skills training for medical technologists. This is indicated by a total affirmative response of 98 out of 121 (81 percent agreement). Generally responses from hospitals and universities tend to be similar; however, it is interesting to note that 15 of the total 61 university responses (nearly 25 percent) disagreed with the need for instructional skills training for medical technologists.

Forty-seven of the 121 responses (39 percent) recorded in Table 2 indicated that instructional training should be taught only in the university program as opposed to 13 out of 121 responses (11 percent) who felt the hospital program would be the best site. Another group (43 responses, or 36 percent) felt the subject should be included in both programs. Seventeen participants failed to answer the question; 14 of these were from university programs.

As evidenced in Table 3, there is very little difference between hospitals and universities in this case. Furthermore, there is no observable difference between those wanting an optional program and those wanting instructional skills training to be mandatory.

Again, as shown in Table 4, the results between

Table 1

The Need for Instructional Skills Training in Medical Technology Programs

Degree of Need	Respondents (by group)		
	Hospital	University	Total
Strongly Agree	16	14	30
Agree	39	29	68
Disagree	5	15	20
Strongly Disagree	--	2	2
No Answer	--	1	1
Total	60	61	121

Table 2

Units That Should Be Responsible for Training Medical Technology Students in Instructional Skills

Unit That Should Be Responsible	Respondents (by group)		
	Hospital	University	Total
University	28	19	47
Hospital	5	8	13
Neither	--	1	1
Both	24	19	43
No Answer	3	14	17
Total	60	61	121

Table 3

Instructional Training in Medical Technology Programs: Optional? or Mandatory?

	Respondents (by group)		
	Hospital	University	Total
Optional	25	29	54
Mandatory	31	29	60
No Answer	4	3	7
Total	60	61	121

Table 4

Prevalence of Instructional Skills Training in Medical Technology Programs

	Respondents (by group)		
	Hospital	University	Total
Yes	22	20	42
No	38	41	79
Total	60	61	121

hospitals and universities are very similar. Twenty-two out of 60 hospitals (37 percent) and 20 out of 61 universities (33 percent) include some type of instructional skills training in their programs of Medical Technology. It is important to note that 79 out of 121 (65 percent) do not provide for any training.

Table 5 shows the rank order of instructional skills, first as they are now being taught, and second, according to what skills the respondents would like to see taught. Correlation between the two parts was determined to be 0.78 by the Pearson-Product-Moment Correlation method.

Table 6 again demonstrates a general agreement between hospital responses and those of universities. The most popular method of learning, university courses, received 85 out of 171 responses (50 percent). Of these 85 responses, 50 responses were made by hospital schools.

Table 7 indicated a generally favorable response to slide/tape units for teaching programs. Eighty-nine out of 121 responses (74 percent) indicated that if such units were available, institutions would make use of them. It is interesting to note that 20 institutions would not use the units even if they were made available to them.

In Table 8, it is especially interesting to note that there is a university program of Medical Technology which does not have access to a slide projector and/or a cassette tape player. Lack of interest was the reason selected by eight institutions. Four respondents indicated that they felt it was unnecessary to know this. Eleven

Table 5

Instructional Skills Inventory

Skill	Respondents Now Teaching Skill	Rank	Respondents Desiring to Teach Skill	Rank
Writing Clearly Defined Objectives	27	1	80	4.5
Determining Learning Goals	26	2.5	76	6
Gathering Data-Evaluation of Learning	26	2.5	80	4.5
Reporting Results-Evaluation of Learning	24	4	81	3
Gathering Data-Evaluation of Instruction	23	5	70	10
Interaction with Learners	22	6.5	63	14
Analyze Data-Evaluation of Learning	22	6.5	84	2
Design/Select Learning Experiences	21	8.5	60	18
Plan Small Group Instruction	21	8.5	65	12
Apply Learning Principles	20	10	74	7
Design/Select Evaluation Devices	18	11	61	16
Analyze Data-Evaluation of Instruction	18	12	72	8
Conduct Small Group Instruction	17	14	61	16
Organize Data-Evaluation of Learning	17	14	71	9
Reporting Results-Evaluation of Instruction	17	14	65	12
Planning Individual Instruction	15	16.5	59	19
Using Results to Modify Instruction	15	16.5	88	1
Reducing Goals to Objectives	13	18.5	58	20
Providing Individual Instruction	13	18.5	65	12
Organize Data-Evaluation of Instruction	11	20	61	16
Planning Large Group Instruction	5	21	33	21
Conducting Large Group Instruction	3	22	28	22
Pearson-Product-Moment		Correlation	0.78	

Table 6

Instructional Skills-Modes of Training Respondents Feel Are Most Practical

Mode of Training	Respondents (by group)		
	Hospital	University	Total
Hospital Course	15	14	29
University Course	50	35	85
35mm Slide/Cassette Tape	16	19	35
Other	7	8	15
No Answer	2	5	7
Total	90	81	171

Table 7

Acceptance of a Slide/Tape Unit as a Mode of Learning Instructional Skills in Medical Technology Programs

	Respondents (by group)		
	Hospital	University	Total
Yes	46	43	89
No	9	11	20
No Answer	5	7	12
Total	60	61	121

Table 8

Reasons for the Nonacceptance of Slide/Tape Units as a Mode of Learning Instructional Skills in Medical Technology Programs

	Respondents (by group)		
Reason	Hospital	University	Total
Lack equipment	--	1	1
Lack interest	4	4	8
Unnecessary	1	3	4
Lack time	3	1	4
Other	7	4	11
Total	15	13	28

respondents indicated reasons other than those indicated on the survey form; these will be discussed later.

Table 9 indicates that in all but two of the responding hospitals, medical technologists are taught by other medical technologists.

As shown in Table 10, less than half of the respondents (37 percent) indicate that the instructors in their school have some training in instructional skills. Therefore, 63 percent have no instructional skills training whatsoever. Three percent of the respondents indicate that most of the instructors in their school have Master's Degrees.

Table 11 indicates that in most cases (87 percent) educational coordinators have additional training in instructional skills. Didactic and bench instructors are less likely to have additional training in instructional skills. Seven percent of those responding indicate no additional training in instructional skills for any of the instructors in their program.

According to Table 12, 33 out of 60 respondents (55 percent) have access to the continuing education which they need within their city limits. Another 18 respondents (30 percent) are within commuting distance of a center for continuing education. Only eight percent do not have access to continuing education courses.

Table 13 indicates interest in forms of continuing education other than conventional classroom modes. This question was limited to those respondents who indicated that they were within or outside of commuting distance.

Table 9

Role of Medical Technologists as Instructors in Medical Technology Programs

MT's Taught by MT's?	Respondents
Yes	53
No	2
No Answer	5
Total	60
% Yes	88

Table 10

Current Qualifications of Hospital Laboratory Instructors

	Respondents	
	Yes	% of Total
MT's No additional training	37	62%
MT's Some additional training	22	37%
MT's Master's Degree	2	3%
No Answer	1	2%
Total	60* (62)	100%* (104)

*MT's with Master's Degree are included in the category "MT's with Some additional training".

Table 11

Laboratory Personnel Already Having Instructional Skills Training

Personnel	Total Yes	Total Respondents	% Total
Educational Coordinator	52	60	87%
Didactic Instructors	31	60	52
Bench Instructors	17	60	28
None	4	60	7

Table 12

Respondent's Access to Universities Providing Continuing Education

	Respondents
Within the City	33
Within Commuting Distance	18
Outside Commuting Distance	5
No Answer	4
Total	60

Table 13

Respondent's Interest in Alternative Forms of Continuing Education if They Are Outside Commuting Distance of a University

Interest?	Respondents
Yes	14
No	--
No Answer	13
Total	27

Chapter 5

THE SELF-INSTRUCTIONAL UNIT

The goal of this writer was to help medical technology students as well as medical technologists to understand curriculum development. A goal analysis was performed (see Appendix D). This resulted in the formation of nine behavioral objectives which are presented later in this chapter. A rough content outline was utilized to aid in story boarding and script preparation. The actual content of the unit consists of a brief verbal description of the contents of each of the approximately 150 slides and a narrative statement which complements each slide. The narrative is found in the left-hand column with the corresponding slide description being in the right-hand column. Numerical order refers to the order in which the slides appear in the unit. Quoted material appears on the slides as it is stated.

Script	Slides
1. "Education for Educators in Medical Technology"	1. "Education for Educators in Medical Technology"
2. Developed by Thomas H. Olson MT (ASCP) and the Division of Allied Health, University of Wisconsin-Eau Claire, 1977.	2. "Developed by Thomas H. Olson MT (ASCP) and the Division of Allied Health, University of Wisconsin-Eau Claire, 1977"
3. "Goal Analysis for Curriculum Development"	3. "Goal Analysis for Curriculum Development"

Script	Slides
4. Successful completion of this learning package is dependent upon the completion of the following course objectives.	4. "Course Objectives"
5. "The learner will be able to correctly define the following terms: instruction, goal, condition, criteria, learning outcome, curriculum, learner behavior, behavioral objective."	5. "The learner will be able to correctly define the following terms: instruction, goal, condition, criteria, learning outcome, curriculum, learner behavior, behavioral objective."
6. "The learner will be able to select goals and objectives from a given list of statements."	6. "The learner will be able to select goals and objectives from a given list of statements."
7. "The learner will be able to choose from a list of statements those goals and objectives which are stated in terms of the learner as opposed to those which are teacher-stated goals and objectives."	7. "The learner will be able to choose from a list of statements those goals and objectives which are stated in terms of the learner as opposed to those which are teacher-stated goals and objectives."
8. "The learner will be able to correctly write goals and objectives in terms of the learner."	8. "The learner will be able to correctly write goals and objectives in terms of the learner."
9. "The learner will be able to analyze goals and list learning outcomes which will help to accomplish the goal."	9. "The learner will be able to analyze goals and list learning outcomes which will help to accomplish the goal."
10. "Given properly stated objectives, the learner will be able to correctly label the learning outcome, conditions and criteria for each."	10. "Given properly stated objectives, the learner will be able to correctly label the learning outcome, conditions and criteria for each."
11. "Given learning outcomes, the learner will be able to write behavioral objectives by providing the appropriate conditions and criteria."	11. "Given learning outcomes, the learner will be able to write behavioral objectives by providing the appropriate conditions and criteria."

Script	Slides
12. "Given examples of objectives at each of the six levels of Bloom's Taxonomy, the learner will be able to correctly label the level of each objective."	12. "Given examples of objectives at each of the six levels of Bloom's Taxonomy, the learner will be able to correctly label the level of each objective."
13. "Given examples of behavioral objectives, the learner will be able to evaluate the mechanical correctness of the objectives by means of a list of criteria statements."	13. "Given examples of behavioral objectives, the learner will be able to evaluate the mechanical correctness of the objectives by means of a list of criteria statements."
14. Education can be divided into two separate entities. These are curriculum and instruction.	14. Diagram showing "Education" being separated into "Curriculum" and "Instruction".
15. The curriculum is defined as that which is to be studied. It is the information that will be taught in a course of study. The nine objectives previously stated make up the curriculum for this course.	15. Background: three texts labeled "HEME", "MICRO", and "CHEM". Foreground: text opened midway. Left page caption" 'THE CROSSMATCH"; right page caption: "Goals and Objectives".
16. Instruction, on the other hand, is the coordination of information in such a way that learning may take place. This may occur in several different ways some of which are lecture, tutoring, small group discussion, and, of course just what you are doing now--using a slide/ tape learning package.	16. Typical lecture class in session.
17. Although both curriculum and instruction are necessary parts to the study of education, this course will deal only with curriculum.	17. "Education" separated into "Curriculum" and "Instruction--"Curriculum" emphasized.

Script	Slides
18. As stated before, curriculum is that material which is to be taught in a course of study. Curriculum is composed of goals and objectives.	18. "Curriculum" separated into "Goals" and "Objectives".
19. A goal is a broad, vague statement of intent. Goals are far-reaching, time consuming and often difficult to accomplish. Everyone has goals for themselves; perhaps one of your goals is . . .	19. "Goal: Broad, vague statement of intent."
20. To pass the Registry. . . .	20. Medical technology student watching a bunsen burner mentally picturing himself as "Joe Green MT (ASCP)".
21. Or to become Laboratory Supervisor.	21. Lab supervisor in office--chair tilted back and feet on desk top.
22. As most medical technologists will be involved in some aspect of education, one of your goals should be to be able to develop curriculum.	22. "Goal: To be able to develop Curriculum."
23. Now examine the following statements. Remembering what has been said about goals, choose the statements that could be goals.	23. "A. The learner will become an expert in medical technology. B. The medical technologist will be able to write her autobiography and become famous. C. The student read her autobiography and was not impressed."
24. A and B are statements indicating some future event and could be goals. C refers to some event which has passed and is not a goal. Now examine these next two statements and choose the one(s) which could be goals.	24. "Goals" Future oriented. A and B Yes. C No".

Script	Slides
25. (Briefly pause). A fulfills the criteria necessary to be a goal. It is a broad, vague subject, future oriented, and even difficult to accomplish. B, on the other hand, is a very specific, well-defined statement. Generally speaking, goals are the fuzzy, undefined statements while the more clearly defined statements are referred to as objectives.	25. "A. The learner will be able to understand enzyme kinetics. B. By using the Michaelis/Menten equation, the learner will be able to calculate maximum velocity (Vmax)."
26. Now stop the tape and write some goals of your own. (Briefly pause). Do the goal statements which you have written represent broad, undefined events? Are they directed towards some future-oriented accomplishment? Would it be difficult to accomplish the task given no other information? If so continue with the learning package.	26. "Goals: Broad, vague statements of intent. Future oriented. Difficult to accomplish".
27. Consider the following example: The goal is to understand chemistry. Now what does that mean?	27. "Goal: To understand Chemistry".
28. It might mean "to be able to perform chemistry tests . . . "	28. Medical Technologist pouring solution from one test tube to another. Caption: "Performance".
29. Or it might mean "Comprehending the principles behind the test . . . "	29. Laboratory test with possible results. Caption: "Principles".
30. Or it might mean "to be able to interpret chemistry test results."	30. Medical technologist mentally picturing a pregnant woman. Caption: "Interpretation".

Script	Slides
31. Or it might mean all these things, but we cannot tell for sure. So in order to clarify the meaning of a goal . . .	31. Confused-looking Medical Technologist. Caption: "To perform chemistry tests? To recite principles? To interpret chemistry tests?" Caption is superimposed on a huge question mark.
32. . . . we perform a Goal Analysis. We may not be able to separate a goal into its parts in the same manner as blood serum is analyzed by instruments, but just as serum can be analyzed to give specific test results, so likewise goals can be separated into specific entities called . . .	32. Medical technologist analyzing goals by means of a SMA"G" (Sequential Multiple Analyzer of Goals). Caption: "Goal Analysis".
33. Learning outcomes. Learning outcomes are specific performances. Examples of learning outcomes would be . . .	33. Goal is separated into 1, 2, 3, . . . learning outcomes.
34. . . . Performing a differential count . . .	34. Medical technologist is performing a differential count with a microscope.
35. . . . Or drawing a tube of blood.	35. Medical technologist is about to perform venipuncture on patient in bed. Caption over patient: "Yipe!!!"
36. In any case learning outcomes indicate the performance to be done.	36. Learning outcome = specific performance.
37. In any performance, the action is very important. The verb is responsible for this action. A very important aspect to any learning outcome is the verb. The verb should indicate either 1) an	37. "Verb: 1) observable behavior--Ex. 'Will recite' 2) product of observable behavior--Ex. 'Will list'".

Script	Slides
observable behavior, or 2) a product of an observable behavior.	
38. Learning outcomes still leave something to be desired. In order to be more useful, we have to know under what conditions the performance will be evaluated, and to what extent the performance must be accomplished. By mixing the proper concentration of condition and criteria with a learning outcome, we are able to form . . .	38. Test tubes of condition and criteria poured into a beaker of learning outcome. Labeled as such.
39. . . . The behavioral objective. Behavioral objectives are the end products of the goal analysis. They enhance the learning process by giving meaning to the behavior we hope to accomplish.	39. Partially broken test tubes and beaker indicating explosion. Centered caption: "Behavioral Objective".
40. Conditions, then, are the circumstances involved in demonstrating achievement of a given task. They define the task in ways which help the learner to understand exactly how the task is to be accomplished or how it is to be evaluated.	40. "Conditions: The circumstances involved in demonstrating achievement."
41. Some possible condition statements could be: A. Given a multimeter and a circuit board . . . B. On a written examination C. Within one hour . . . D. Using no additional aids.	41. "A. Given a multimeter and a circuit board . . . B. On a written examination . . . C. Within one hour . . . D. Using no additional aids . . . "
42. Applying conditions to the learning outcomes will often indicate the instructional mode to be used. For	42. "The learner will be able to demonstrate knowledge of a microscope in a practical examination."

Script	Slides
example, take the statement "The learner will demonstrate knowledge of a microscope in a practical exam."	
43. In this example it can be seen that at least part of the instruction should be some practical experience with the microscope since the conditions for evaluation indicate an examination of practical experience.	43. Medical technologist using a microscope.
44. Identify the condition in the following example: Given a list of terms in a written exam, the learner will define the terms correctly.	44. "Given a list of terms in a written examination, the learner will define the terms correctly."
45. Your answer should be: "Given a list of terms in a written exam." This part of the objective indicates the circumstances under which the task is to be evaluated.	45. "Given a list of terms in a written examination, the learner will define the terms correctly."
46. Now that we have discussed the conditions under which the task is to be accomplished, we must consider the extent to which the task is to be accomplished. Criteria are the standards which are used as a basis for evaluation of the behavior or that which is produced by the behavior.	46. "Criteria: The standards for evaluating behavior or products of behavior."
47. Here are examples of possible criteria: . . . 18 out of 20 correct . . . correctly all . . . with 95% accuracy . . . within 2 standard deviations	47. ". . . 18 out of 20 correct. . . . correctly all. . . . with 95% accuracy. . . . within two standard deviations."

Script	Slides
48. Consider the following example: "On a written exam the learner will be able to define eight out of ten terms correctly." What criteria are present in this example?	48. "On a written examination the learner will be able to define eight out of ten terms correctly."
49. If you said, "correctly eight out of ten you are correct."	49. "On a written examination the learner will be able to define eight out of ten terms correctly."
50. In the following example locate the learning outcome, the conditions, and the criteria. "On a written exam, the learner will be able to list five liver function tests correctly."	50. "On a written examination the learner will be able to list five liver function tests correctly."
51. The learning outcome for this example is "to list liver function tests."	51. "On a written examination the learner will be able to list five liver function tests correctly."
52. The conditions are "On a written examination".	52. "On a written examination the learner will be able to list five liver function tests correctly."
53. The criteria are "correctly five."	53. "On a written examination the learner will be able to list five liver function tests correctly."
54. Conditions and criteria help to clarify the meaning of the learning outcome for both the learner and the instructor.	54. "Learning outcome + Condition + Criteria = More meaningful education."
55. All too often instructors concentrate too heavily on the instructional aspect and neglect the most important part--the learning.	55. Instructor lecturing to daydreaming student.

Script	Slides
56. In order for learning to be an active process, the learner has to play an active role in the learning process. Otherwise the learner may not know what is expected of him.	56. Puzzled face surrounded by question marks.
57. Perhaps, then, the most sensible thing to do at this point is to write behavioral objectives in terms of the learner.	57. Medical technologist in Sherlock Holmes disguise holding magnifying glass. Caption: "Ah Ha!" Caption under magnifying glass: "The learner will be able to . . . "
58. "In a practical exercise, the instructor will present 30 slides showing normal and abnormal Red Blood Cell Morphology." In this example the objective is written in terms of the instructor. Note that nowhere in the objective is any learner action indicated.	58. "In a practical exercise the instructor will present 30 slides showing normal and abnormal RBC morphology."
59. Here this same example is shown from a student's viewpoint. Note that the learner is informed how he will be evaluated and the basis for success in the exercise.	59. "In a practical exercise the learner will be able to name correctly 25 out of 30 RBC's in a set of 30 slides of normal and abnormal RBC morphology which are presented by the instructor."
60. In this example, is the objective teacher oriented or learner oriented? "Given a list of 20 microorganisms, the learner will be able to write one type of media which will permit growth of the microorganism and one type which will inhibit growth for all 20 microorganisms on a written exam." If you said that this was written in terms of the learner, you are correct.	60. "Given a list of 20 microorganisms, the learner will be able to write one type of media which will permit growth of the microorganism and one type which will inhibit growth for all 20 microorganisms on a written examination."

Script	Slides
61. Is this an example of a teacher-oriented or learner-oriented objective? "Given an Auto-Analyzer, the principle of the Auto-Analyzer will be demonstrated to the class." This is an example of a teacher-oriented objective. Again, no participation is indicated for the learner in the learning experience. Now rewrite this objective in terms of the learner.	61. "Given an Auto-Analyzer, the principle of the Auto-Analyzer will be presented to the class."
62. If your objective is similar to this example you are correct.	62. "Given an Auto-Analyzer, the learner will be able to correctly demonstrate the principle of the Auto-Analyzer in a practical examination."
63. Now stop the tape and write some objectives of your own. Keep in mind that the learner should have an active role in his learning process. In your objectives be able to locate the learning outcomes, the conditions and the criteria for judging the extent of accomplishment. (Briefly pause).	63. Objective: Learner oriented? Learning outcome? Condition? Criteria? Active process?
64. In way of a review so far: Goals and objective make up the curriculum for a course of study.	64. "Goals" combining with "Objectives" to form "Curriculum".
65. Goals are broad vague statements of intent that are undefined as to their meaning and require a process called goal analysis to give them meaning.	65. Goal Analysis converts goals with unclear meaning to objectives with well defined meaning.

Script	Slides
66. Objectives are composed of a terminal behavior (Learning outcome), conditions and criteria. They should be written in terms of the learner. The verb should indicate an observable performance.	66. Objectives are composed of conditions, criteria, and terminal behaviors which 1) are written in terms of the learner, and 2) have verbs indicating observable performance.
67. Properly written behavioral objectives aid the student in the learning process in that they tell the student 1) what he is expected to do, 2) the conditions under which he will perform, and 3) the extent to which he will be expected to perform.	67. "1) Performance. 2) Conditions. 3) Extent (Criteria)".
68. And now for Goal Analysis-- a method of clarifying goals and giving them meaning.	68. Doctors in operating room are preparing to operate on a goal. Nurse holds book for doctor to read. Caption on book: "How to analyze goals."
69. There are several ways in which we might perform a goal analysis. We might start off by simply listing all the outcomes we can think of which will aid in the accomplishment of the goal.	69. Goal is separated into a list of learning outcomes.
70. But a simple listing can be misleading as we have no easy way of telling if we have included all possible outcomes.	70. Same as #69 except additional captions partially through the list of learning outcomes: "Is this all? Or this?"
71. Perhaps a better way is to start by dividing the goal into two behaviors which together make up the goal.	71. Diagram of goal separated into equivalent behaviors A and B.
72. Then divide each of the behaviors into equivalent sub-behaviors.	72. Same as #71 except A and B are subdivided into C, D, E, and F.

Script	Slides
73. Continue this process until you have reached a terminal observable behavior in each sub-behavior category.	73. Same as #72 except C, D, E, and F are subdivided into G, H, I, J, K, L, M, and N.
74. These terminal behaviors (or learning outcomes) are combined with appropriate conditions and criteria to formulate a list of behavioral objectives--the end product of a goal analysis.	74. "Terminal behavior 1 + Condition + Criteria = Objective 1. Terminal behavior 2 + Condition + Criteria = Objective 2. Terminal behavior X + Condition + Criteria = Objective X.
75. In some cases the nature of the goal might indicate a dividing into three equivalent behaviors or sub-behaviors. If such is the case, take advantage of it. Remember, goal analysis is a tool to aid you in curriculum development; it is not meant to hinder you.	75. Goal separated into three equivalent parts.
76. This course has developed around the goal "The learner shall understand how to develop curriculum." A goal analysis was used to clarify the meaning of the goal.	76. "The learner shall understand how to develop curriculum."
77. We started with the goal behavior--understand curriculum development. Since curriculum is made up of goals and objectives that is a logical second step.	77. Breakdown of the goal "Understand Curriculum Development" into sub-behaviors--branch diagrams.
78. The next branch would consist of those behaviors which effect 1) the understanding of goals, and 2) the understanding of objectives. Notice how understanding can be verified by demonstrating a knowledge and demonstrating skill.	78. Further branching of the goal analysis diagram.

Script	Slides
79. The branching and dividing process continues until learning outcomes are reached and the diagram looks like this. Some branches divide into three or more. The terminal objectives form the curriculum for this course.	79. Complete branch diagram as can be seen in Appendix D.
80. Diagrams will vary with the complexity of the goal, but generally speaking, all will have this basic format. Now stop the tape and try to analyze one of the goals which you have written. When you have finished, continue with the learning package.	80. Repeat of #73.
81. As previously stated, the terminal behavior forms the basis of the behavioral objective. The nature of the behavior will influence what conditions and criteria are applied to the behavior to form the final objective. Each behavior is by nature a unique situation and requires careful thought and consideration before the final objective is written.	81. Puzzled face surrounded by captions: "How extensive must this be completed? Is this method important? Does the student need to know all six? Will four out of five do? What am I looking for?"
82. A further consideration to be made in writing the final objective is the level of understanding which the learner must attain to satisfy the objective.	82. Meter displaying level of understanding. The six levels of Bloom's Taxonomy are points on the meter. An objective is being poured into the cuvette well.
83. Benjamin Bloom, in an attempt to classify these levels of understanding, described a hierarchy of six categories of understanding. He called this the Taxonomy of the Cognitive Domain. In it are	83. "Taxonomy of the Cognitive Domain Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation."

Script	Slides
knowledge, comprehension, application, analysis, synthesis, and evaluation.	
84. Level 1, knowledge, does not involve understanding; knowledge involves the recall of specific facts as would be learned by rote memorization.	84. "1) Knowledge".
85. The following two examples are written in the knowledge level of Bloom's Taxonomy. Note that in each example no "Thinking" is involved--only recalling facts from memory. "On a written exam, the learner will be able to correctly write the four blood types and the percentage of Americans in which each is found."	85. "On a written examination, the learner will be able to correctly write the four blood types and the percentage of Americans in which each is found."
86. "On a written exam, the learner will be able to correctly list all the reactions of the following microorganisms with media found in enterotubes: E. coli, Klebsiella species, Pseudomonas aeruginosa.	86. "On a written examination the learner will be able to correctly list all the reactions of the following microorganisms with media found in Enterotubes: E. coli, Klebsiella sp., Pseudomonas aeruginosa."
87. The second Taxonomy level, Comprehension, is the lowest level of understanding. Comprehension in behavioral objectives is evidenced by: 1) the ability to translate material into different forms. 2) the ability to interpret material. 3) the ability to estimate future trends.	87. "2) Comprehension".

Script	Slides
88. Note the following two examples as written in the comprehension level of Bloom's Taxonomy. "On a written test the learner will be able to correctly answer questions pertaining to material found in various bar charts, histograms and graphs."	88. "On a written test the learner will be able to correctly answer questions pertaining to material found in various bar charts, histograms and graphs."
89. "The learner will be able to write a paragraph summarizing a given journal article on sensitivity testing." Objectives in the comprehension level of Bloom's Taxonomy are written such that they require enough understanding to put information into your own words. Paraphrasing is a part of comprehension.	89. "The learner will be able to write a paragraph summarizing a given journal article on sensitivity testing."
90. The third level of Bloom's Taxonomy is Application. Application involves the use of learned material (i.e. rules, concepts) in new and concrete situations.	90. "3) Application".
91. Consider the following two objectives as examples of the third level--Application. "Using Beer's Law on a written exam, the learner will be able to correctly convert absorbance values to percent transmittance and percent transmittance values to absorbance."	91. "Using Beer's Law on a written examination, the learner will be able to correctly convert absorbance values to percent transmittance and percent transmittance values to absorbance."
92. "On a written exam the learner will be able to calculate the creatinine clearance on a 24-hour urine sample given the appropriate data."	92. "On a written examination the learner will be able to calculate the creatinine clearance on a 24-hour urine sample given the appropriate data."

Script	Slides
In both of these examples various concepts are used in order to solve a new problem. Another way of saying the same thing would be the use of abstractions in a concrete situation.	
93. Analysis is the fourth level of Bloom's Taxonomy. Analysis refers to the breakdown of material into its component parts in order to understand the basic organizational structure.	93. "4) Analysis".
94. These two examples show the fourth level of understanding--analysis. "Provided with data which has accumulated over a long period of time, on a written test, the learner will be able to correctly trace the development of different strains of E. coli."	94. "Provided with data which has accumulated over a long period of time, on a written test, the learner will be able to correctly trace the development of different strains of E. coli."
In this first example, a pattern is being developed and the learner is asked to use historical data to trace this pattern.	
95. "As a practical exercise, the learner will analyze a chemistry testing procedure to determine the principles from which the procedure evolved." In this second case, a whole is being broken down in order to better understand its parts.	95. "As a practical exercise, the learner will analyze a chemistry testing procedure to determine the principles from which the procedure evolved."
96. The fifth level of understanding in Bloom's Taxonomy is synthesis. Synthesis refers to the ability to put parts together to form a new whole.	96. "5) Synthesis".

	Script	Slides
97.	Here are two examples of objectives where synthesis is the highest level of understanding. "As a written assignment, the learner will develop a procedure for orienting new employees to the laboratory which includes the following topics: 1) safety, 2) laboratory regulations, 3) laboratory organization, 4) introduction to employees, and 5) tour of facilities."	97. "As a written assignment, the learner will develop a procedure for orienting new employees to the laboratory which includes the following topics: 1) safety, 2) laboratory regulations, 3) laboratory organization, 4) introduction to employees, and 5) tour of facilities."
98.	"As a practical exercise, the learner will develop a plan of laboratory coverage for use in an emergency. Coverage must be maintained for three days, and no person may work more than eight hours per day." Both of these examples employ the development of a procedure --the building of a new whole. Other examples might include making a generalization or hypothesis, utilizing a theme.	98. "As a practical exercise, the learner will develop a plan of laboratory coverage for use in case of emergency. Coverage must be maintained for three days and no person may work more than eight hours per day."
99.	The final and highest level in Bloom's taxonomy is called Evaluation. In this level judgments are made on the basis of definite criteria.	99. "6) Evaluation".
100.	Consider these two examples depicting evaluation. "The learner will determine in four out of five cases on a written exam whether or not test results are indicative of a certain disease process.	100. "The learner will determine in four out of five cases on a written examination whether or not test results are indicative of a certain disease process."

Script	Slides
101. "Under the direct supervision of a Medical Technologist on a dual head microscope, the learner will count 100 white blood cells. He will correctly name and label 90 percent of the cells as normal or abnormal."	101. "Under the direct supervision of a medical technologist on a dual head microscope, the learner will count 100 WBC's. He will correctly name and label 90% of the cells as normal or abnormal."
In both of these examples value judgments are being made on the basis of definite criteria. In the first example the criteria are normal ranges; in the second example the criteria are cell characteristics such as cytoplasm, size, shape.	
102. In the following examples of behavioral objectives, choose the highest level of understanding indicated in each example according to Bloom's Taxonomy.	102. "Bloom's Taxonomy Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.
103. "In a written exam, the learner will be able to correctly write Beer's Law as a symbolic statement."	103. "Example A: In a written examination the learner will be able to correctly write Beer's Law as a symbolic statement."
104. If you chose comprehension for example A, you are correct. Comprehension involves the translation of one form into another.	104. "Comprehension--the ability to translate material into different forms."
105. "The learner will develop a procedure for the determination of LDH isoenzymes by chemical means."	105. "Example B: The learner will develop a procedure for the determination of LDH isoenzymes by chemical means."

Script	Slides
106. Example B is a level 5 objective. If you chose synthesis, you are correct. The development of a new procedure involves synthesis.	106. "Synthesis--creating a new whole from parts."
107. "The learner will convince the senile patient by reverse psychology to allow the medical technologist to draw a sample of blood."	107. "Example C: The learner will convince the senile patient by reverse psychology to allow the medical technologist to draw a sample of blood."
108. In this example the learner is asked to use a principle to aid in accomplishing a given task. Application involves the use of learned material in new situations or an abstraction in a real situation. If you choose Application, you are correct.	108. "Application--using rules or principles in new situations."
109. "In a written exam, the learner will correctly list the five immunoglobulins and whether or not they fix complement."	109. "Example D: In a written examination the learner will correctly list the five immunoglobulins and whether or not they fix complement."
110. Example D is written in the lowest level of the Taxonomy--Knowledge. Knowledge involves the recall of specific facts--rote memorization.	110. "Knowledge--recall of specific information."
111. "As a written exercise, the learner will prepare a new method for recording environmental cultures. The form must include: 1) location, 2) microorganism, 3) reasons, 4) corrective action, and 5) a place for follow-up check."	111. "Example E: As a written exercise, the learner will prepare a new method for recording environmental cultures. The form must include: 1) location, 2) microorganism, 3) reasons, 4) corrective action, and 5) a place for follow-up check."

Script	Slides
112. The development of new methods or forms falls into the category Synthesis. In this case the learner is asked to take data and put together some type of record for the data.	112. "Synthesis--putting parts together to form a new whole."
113. "The learner will write a paragraph summarizing the movie "Determination of Plasma Proteins". The paragraph should include methods, sensitivity for each method, and method of choice.	113. "Example F: The learner will write a paragraph summarizing the movie, "Determination of Plasma Proteins'. The paragraph should include methods, sensitivity for each method and method of choice."
114. Example F is indicative of comprehension. The learner is asked in this example to interpret a movie and summarize the material in a paragraph.	114. "Comprehension--interpretation of material."
115. "The learner will correctly determine the constituents of urinary calculi. This will be done as a practical exam."	115. "Example G: The learner will correctly determine the constituents of urinary calculi. This will be done as a practical exam."
116. By analysis we break down a whole into its parts such that we may better understand the whole. If you chose Analysis for example G, you are correct.	116. "Analysis--reducing a whole into parts."
117. "As a practical exercise, the learner will determine which method is superior for the determination of blood glucose: O-Toluidine, Glucose reduction of Copper sulfate, Alkaline Ferricyanide, or glucose oxidase. Criteria to be used include method specificity and sensitivity."	117. "Example H: As a practical exercise, the learner will determine which method is superior for the determination of blood glucose: O-Toluidine, Glucose reduction of Copper sulfate, Alkaline Ferricyanide, or glucose oxidase. Criteria to be used include method

Script	Slides
	specificity and sensitivity."
118. Example H portrays the learner as making a judgment regarding the method of choice for a chemical analysis. Evaluation is the making of value judgments based on definite criteria.	118. "Evaluation--making judgments."
119. Note the comparison of Example H and Example F. In Example H you are asked to make a judgment based on experimental data and definite criteria. In Example F the decisions have already been made; you are only asked to interpret this information.	119. Repeat of #114.
120. "In a written exam, the learner will list correctly all the 'heart' enzymes and the order in which they appear elevated in serum following myocardial Infarction."	120. "Example I: In a written examination the learner will list correctly all the 'heart' enzymes and the order in which they appear elevated in the serum following myocardial infarction."
121. Example I involves the simple recall of information--knowledge.	121. "Knowledge--recall of information."
122. "As a practical exercise, the learner, given five unknown microorganisms in mixed culture, will be able to name four out of five organisms by using various biochemical reactions."	122. "Example J: As a practical exercise, the learner, given five unknown microorganisms in mixed culture, will be able to name four out of five organisms by using various biochemical reactions."

Script	Slides
123. This objective is clearly written in the Application level of understanding. In order to identify organisms one would need to use various rules and concepts for each organism. If you chose Application you are correct.	123. "Application--the use of learned material in new and concrete situations."
124. "In a practical situation, the learner will be able to determine the acceptibility of a test result. Criteria will include the results of various control samples."	124. "Example K: In a practical situation the learner will be able to determine the acceptibility of a test result. Criteria will include the results of various control samples."
125. If you indicated Evaluation for this objective, you are correct. The learner in this situation is forced to make a judgment on the basis of definite criteria.	125. "Evaluation--making judgments."
126. "Given an article from AJMT, the learner will be able to separate all the underlying principles which help to clarify the meaning of the article."	126. "Example L: Given an article from AJMT, the learner will be able to separate all the underlying principles which help to clarify the meaning of the article."
127. This example is written in the Analysis level of understanding. Analysis is the separating out of component parts of something.	127. "Analysis--separating out components."
128. It is important, when writing objectives to remember the existence of these levels of understanding. Writing objectives in the various levels will aid the learner in his ability	128. "Bloom's Taxonomy Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation."

Script	Slides
to think and reason and enable him to be more competent in his profession.	
129. When behavioral objectives have been written it is important to evaluate these objectives to determine if they are mechanically correct. This is a form of "educational quality control."	129. "Educational Quality Control."
130. In order to evaluate objectives, there are definite questions which may be asked regarding each objective.	130. "Questions to Ask"
131. First, is the objective stated in terms of the learner? Learner behavior is important because it makes learning an active process. The learner is given responsibility for carrying out the assigned task.	131. "1) Learner behavior. Is the objective stated in terms of the learner?"
132. Second, does the verb indicate either 1) an observable behavior, or 2) an observable product of behavior which can be evaluated?	132. "2) Performance. Does the verb indicate 1) an observable behavior, or 2) an observable product of behavior?"
133. Third, is the situation described in which the learning will be evaluated? In other words, is there a condition statement?	133. "3) Condition. Is the situation described in which the learning will be evaluated?"
134. And finally, is the standard given for evaluating the behavior or product? Is there a statement of criteria for evaluation?	134. "4) Criteria. Is the standard given for evaluating the behavior or product?"

Script	Slides
135. These four statements comprise the criteria for evaluating objectives. If an objective meets all four criteria, the objective is mechanically correct. Evaluate the following examples to determine if they are mechanically correct.	135. "Is the objective stated in terms of the learner?" Does the verb indicate 1) an observable behavior, or 2) an observable product of behavior? Is the situation described in which the learning will be evaluated? Is the standard given for evaluating the behavior or product?"
136. "The medical technology student will appreciate the sense of responsibility involved in his profession."	136. "Example A: The medical technology student will appreciate the sense of responsibility involved in his profession."
137. This objective is not mechanically correct. The verb does not indicate an observable behavior.	137. One medical technologist observing another medical technologist lying on a bed. Two captions: "What are you doing?" "I'm appreciating my sense of responsibility. Can't you tell?"
138. Note the difference in this objective as opposed to Example A. "The medical technology student will list in writing three responsibilities of a medical technologist."	138. "The medical technology student will list in writing three responsibilities of a medical technologist."
139. Is this objective mechanically correct? "On a written test the learner will be able to list methods of analyzing glucose." (Briefly pause).	139. "Example B: On a written test the learner will be able to list methods of analyzing glucose."
140. This objective is not correct as it contains no criteria statement. The learner does not know what constitutes a correct answer.	140. Puzzled face surrounded by captions: "Is one enough?" "Maybe I should list three." "Better make it five." Numerous question marks in the background.

Script	Slides
141. This objective might be corrected in the following way. "On a written test, the learner will be able to list four methods of analyzing glucose."	141. "On a written test the learner will be able to list four methods of analyzing glucose."
142. Consider the following example. Is it mechanically correct? "As a practical exercise the learner will be able to analyze a serum specimen for 1) cholesterol, 2) uric acid, 3) triglycerides, and 4) phosphorus. Values obtained will be reported to one decimal place and must be within two standard deviations of the control value." (Briefly pause). This objective is mechanically correct.	142. "Example C: As a practical exercise the learner will be able to analyze a serum specimen for: 1) cholesterol, 2) uric acid, 3) triglycerides, and 4) phosphorus. Values obtained will be reported to one decimal place and must be within two standard deviations of the control value."
143. A great deal of information has been presented in this learning package. Please feel free to repeat any part or all of the learning package as often as necessary in order to better understand the development of curriculum.	143. Puzzled face surrounded by captions and question marks: "criteria? terminal behavior? synthesis? broad, vague statements of intent? objective? evaluate? goal? analysis?"
144. To review--goals and objectives make up the curriculum.	144. Repeat of #64.
145. Because of the nature of instructional goals, they must be reduced to behavioral objectives in order to be meaningful to the learner.	145. Repeat of #65.
146. The procedure for reducing goals to objectives is called goal analysis. It involves dividing and	146. Repeat of #73.

Script	Slides
subdividing the goal until terminal behaviors are reached.	
147. These behaviors are provided with appropriate conditions and criteria in order to form behavioral objectives.	147. "Behavior (learning outcome) + condition + criteria = behavioral objective."
148. Objectives may be written in any one of six levels of understanding. This hierarchy of understanding is called Bloom's Taxonomy of the Cognitive Domain.	148. "Bloom's Taxonomy: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation."
149. Objectives should be evaluated to ensure that they are properly written. These four criteria are used to determine if a behavioral objective is mechanically correct.	149. Repeat of #135.
150. The use of behavioral objectives ensures a more meaningful curriculum which when combined with quality methods of instruction will provide better education for all.	151. "Curriculum + Instruction = Education"
151. The end.	151. "THE END!"

Chapter 6

DISCUSSION AND CONCLUSIONS

The questionnaire response rate totaled 63 percent. Of this total, the specific rates for the two groups involved, hospital and university programs were nearly identical; 60 hospitals and 61 universities responded to the questionnaire. Much of the information received was analyzed in terms of the two groups. The fact that the response rates were equivalent enhances the visual perception of the tabular data.

For the most part responses from the two groups were similar, indicating a mutual understanding of the situation experienced by each other. In some cases, however, a substantial difference was noted. For example, nearly 25 percent of those responding from universities disagreed with the need for instructional skills training for medical technologists, compared to only eight percent disagreement out of the hospital responses. Medical technologists do a great deal of teaching in hospital schools and people in university programs might not be aware of this, especially in those cases where Medical Technology is not a full time department but a sideline duty of a Biology or Chemistry Department staff member. In any case the total affirmative response was 81 percent. This indicates a growing awareness

of the need for instructional skills training for medical technologists as evidenced by professional organizations such as ASMT and ASCP supporting such training.

Despite a strong concern for instructional skills training, there exists a certain amount of apathy over where such training should take place. Seventeen respondents (of which 14 were from universities) failed to indicate the most desirable location for such training. This indifference may be indicative of the distinct separation of the student from the university once the student has entered the internship year.

Seventy-nine out of 121 respondents indicated that no instructional skills are currently included in their curricula. Several possible reasons for this are 1) too much information to teach in too little time and 2) those doing the teaching in these institutions do not understand the concepts themselves. Although the former cannot be neglected, this writer feels that the latter is a very significant reason why instructional skills are not being taught. This is evident in the comments received in the questionnaire. Many of the comments expressed a lack of understanding of the concepts. Some respondents went so far as to say that all education courses are worthless. To this writer that indicates a definite lack of understanding.

In regard to the mode of learning instructional skills, the majority of responses indicated that university courses would be the most practical. This is a logical response since university courses designed for prospective

teachers already exist. One might think that since the student spends three-fourths of his time on a college campus in most programs, this would be the easiest place to adjust schedules. However, this part of the instructional experience is also nearly filled to capacity.

In that particular question, courses in hospital and university programs were included with 35mm slide/tape presentations. It is recognized by this writer that these are not equitable responses. A response for slide/tape packages was added to the survey primarily to gather further information regarding the acceptability of such packages; the advisability of developing such a unit was dependent upon this information.

Other means of learning instructional skills indicated were: 1) seminars, 2) workshops, and 3) additional training beyond graduation. These are all valid ideas; however not all graduates take positions where they have access to workshops or other forms of continuing education. Many step into positions where they are expected to teach the first year out of school and there is little or no chance for training at that point.

As noted in Chapter four, table seven, 20 people indicated that they would not use a slide/tape unit for teaching instructional skills even if it were made available for their use. This writer feels that this again is due to apathy on the part of those respondents. Among the reasons given why such a unit would not be used, eight respondents

indicated lack of interest; four respondents indicated that it was unnecessary to learn such skills. One university respondent indicated that his institution did not have access to equipment for using a slide tape unit, e.g. a slide projector and a cassette tape player. The writer doubts the validity of this last response. Other reasons given in the "other" category included: 1) no appropriate course, 2) one cannot learn by tapes, 3) it would be better to replace the histology course in the college program with instructional training programs, and 4) lack of time.

In regard to who is teaching in hospital programs, 88 percent indicated that medical technologists are the clinical instructors. Thirty-seven percent of these same institutions reported that their instructors had some training in instructional skills; three percent of the hospital programs reported that their instructors had advanced degrees. What this means is that nearly two-thirds of the clinical instructors have no preparatory training in instructional skills and are subsequently not adequately qualified as instructors.

General comments present on the questionnaire ranged from one extreme to the other. One respondent stated that over reaction to students' needs will lead to the downfall of the entire educational structure. Another claimed budgetary problems as being their excuse. A third excuse given was that most education courses are a waste of time. Teaching skills are inborn and either one has them or he

doesn't. Still others felt that their programs were already crowded. One respondent commented that the period of time allotted to clinical training should be increased from one year to 18 to 24 months. Another placed the responsibility for training clinical instructors on the shoulders of the degree-granting institutions.

On the other side, many comments were received indicating a favorable acceptance of instructional skills training. One respondent indicated that this year's class would be the first to receive an education course during the internship. Another indicated that several instructors were presently working on Master's Degrees. Still another stated that all aspects of instructional skills training should be included despite the fact that there is no way of presenting in depth coverage.

Briefly stated, one comment received was that students are not receiving any instructional skills training before their fourth year; the pre-professional program is quite full. Yet there is a definite need for a self-teaching unit in hospitals--not just for students, but for all instructors. Another stated that any professional person should be able to plan, implement, and evaluate.

In this writer's opinion, the following comment says it best. "I believe it is important for all Medical Technologists to have some basics in education. Nearly everyone will eventually be involved, in some way, in teaching others, e.g. teaching co-workers, or inservice."

Conclusions

Overall the study determined everything that it was designed to do. The following conclusions are drawn from the study:

1. Instructional skills training is included in only one-third of the medical technology programs surveyed.
2. The majority of those responding felt that instructional skills should be taught in the university classroom; however nearly three-fourths of those responding felt that the use of slide/tape units was an acceptable alternative method of learning instructional skills.
3. Medical technologists, as a rule do not know
   a. how to teach a subject
   b. how to evaluate whether or not a student has learned the material
   c. if the student has not learned the material, how to ensure that the student does indeed learn it.
4. The development of a slide/tape unit would be of great benefit to medical technology students (both in the hospital and university), clinical instructors and staff technologists alike.

Chapter 7

SUMMARY AND RECOMMENDATIONS

In a 1973 issue of Cadence, Annamarie Barros writes, "The laboratory is a business and needs a business approach at all levels. The clinical portion of the students' education should be handled by individuals who have some knowledge of how to teach in addition to their knowledge of what to teach."[12]

A survey of 100 hospital programs and 100 university programs across the United States showed that only one-third of the curricula in these programs presently provide instructional skills training for medical technology students. Only 37 percent of the hospital programs reported any instructional skills training for their clinical instructors. Three percent of the instructors had advanced degrees.

These responses along with the writer's past experience indicated a definite need for some type of alternative form of learning instructional skills. Based on cost, access to necessary equipment and most of all suitability for learning, the decision was made by the writer to develop a self-instructional learning package suitable for use in both hospitals and university programs of medical technology. Because of the natural sequential order of planning, implementing and evaluating of instruction and learning, it was

decided that the planning stage should be the first to be developed. A 35mm slide/cassette tape learning package on goal analysis for curriculum development, including a detailed explanation of goals and behavioral objectives was developed by the writer. The actual production will be performed by the Media Development Center at the University of Wisconsin-Eau Claire in cooperation with the writer and the Division of Allied Health, University of Wisconsin-Eau Claire.

It is the sincere hope of this writer that this learning package will enable medical technology students and instructors and even those who are only remotely involved with laboratory education to better understand the learning process and to play an active part in it.

Recommendations

Based on the results of the survey and the experience of the writer, the following recommendations are made.

1. The unit should be field tested to determine its effectiveness in accomplishing its designated task.
2. If, upon testing, weaknesses are determined to be evident in the unit, the unit should be modified to correct these deficiencies or weak spots.
3. If changes are made, the unit should be field-tested again to determine the effect of any modification.
4. In order to be effective, this unit should be

placed in institutions where it will aid in the learning process. It should be recognized that this unit was designed especially for medical technologists; however, other groups might also benefit from the use of this learning package, i.e. nurses, x-ray, histology, physical and respiratory therapists to name but a few.

5. In Chapter four, table five, an inventory of instructional skills is ranked, first, in order of what is now being taught, and second, what instructors would like to see taught. Many additional learning packages could be developed based on the data from this table. It is hoped that others will take advantage of this data and elect to prepare such learning packages as would be needed.

FOOTNOTES

FOOTNOTES

[1]W.J. Popham, "Objectives and Instruction", Unpublished course material, p. 1.

[2]Ibid., p. 1.

[3]S.N. Postlethwait, et. al., The Audio Tutorial Approach to Learning, 2nd. ed., (Minneapolis: Burgess Publishing Company, 1969) p. 2.

[4]Bloom, Benjamin S., Taxonomy of Educational Objectives Handbook I, Cognitive Domain, (N.Y.: David McKay Company, Inc., 1556).

[5]Popham, p. 1.

[6]Ibid., p. 3.

[7]California State Legislature, 1970.

[8]R.F. Mager, Goal Analysis, (Belmont, CA: Fearon Publishers, 1972) p. 35.

[9]R.F. Mager, Preparing Instructional Objectives, (Belmont, CA: Fearon Publishers, 1962) p. 43.

[10]Mager, Goal Analysis, p. 35.

[11]ASCP Board of Schools Newsletter, No. 10, August 19, 1971.

[12]Annamarie Barros, "Continuing Education--Why is it Necessary?" Cadence, (November/December, 1973) p. 63.

[13]W. Richard Hargrove, Ed.D., "Education", American Journal of Medical Technology, (December, 1976) p. 484.

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APPENDIX A

UWEC UNIVERSITY OF WISCONSIN - EAU CLAIRE/EAU CLAIRE WISCONSIN 54701

DIVISION OF ALLIED HEALTH

September 28, 1976

Dear Medical Technology Educator:

Quality control is a term that has become very widespread in health care institutions at the present time. America is concerned that all individuals receive the proper dosage of medications, that all chemical reagents meet levels of purity and stability, and even the water must meet certain levels of quality. An important example of the need for quality control in our field today is "quality controlled education".

In order to produce highly efficient experts in the clinical laboratory, we must be developing instructional tools and programs which will meet the educational needs of more clinicians.

I am conducting a survey of 200 hospitals and institutions of higher learning across the country which have either a Medical Technology program or a school of Medical Technology. This is being done in association with the Division of Allied Health at the University of Wisconsin - Eau Claire, Eau Claire, WI.

The purpose of this survey is to gather information concerning the level of instructional training which exists in today's Medical Technology programs. This information will be used to determine where weak areas exist in the planning, implementing and evaluating of instruction and learning, and what types of programs can be developed to correct them.

Would you please respond to the enclosed questionnaire and return it to me in the self-addressed, stamped envelope which I have enclosed for this purpose. Please complete this at your earliest convenience, but return it to me by no later than October 19, 1976.

Thank you very much for your cooperation.

Sincerely,

Thomas H. Olson MT (ASCP)

Thomas H. Olson MT (ASCP)

APPENDIX B

UWEC UNIVERSITY OF WISCONSIN - EAU CLAIRE/EAU CLAIRE WISCONSIN 54701

DIVISION OF ALLIED HEALTH

October 27, 1976

Dear Medical Technology Educator:

On September 30, 1976 a questionnaire was mailed to your institution for your response. The survey consisted of 100 Hospital Schools of Medical Technology and 100 University Medical Technology Programs. The purpose of the survey is to elicit response with regard to training in instructional skills for medical technologists during their undergraduate education. A period of three weeks was alloted for return of the questionnaire; the deadline date was listed as October 19, 1976.

We have received reports indicating that a number of questionnaires were not received until the deadline date. If this happened in your case, would you please take a moment or two and complete the questionnaire? Your response is most important and will be greatly appreciated. Return it to me in the stamped, self-addressed envelope which was enclosed with the questionnaire. If the envelope was lost, please send the questionnaire to:

DIVISION OF ALLIED HEALTH
UNIVERSITY OF WI - EAU CLAIRE
EAU CLAIRE, WI 54701

If the questionnaire was lost or has not arrived by this time, please drop me a note and I will send you a replacement.

If you have already returned your questionnaire, please accept my thanks for your cooperation and participation in the survey.

Sincerely,

Thomas H. Olson

Thomas H. Olson MT (ASCP)

APPENDIX C

EDUCATIONAL CONCEPTS QUESTIONNAIRE

PLEASE RESPOND TO THE FOLLOWING STATEMENTS BY PLACING A CHECK ( ) IN THE SPACE TO THE LEFT OF THE MOST APPROPRIATE RESPONSE.

1. Your institution is best represented as a(n):

   _____Hospital School of Medical Technology
   _____Institution of Higher Learning

2. This questionnaire is being completed by: (more than one may apply)

   _____Educational Coordinator
   _____Staff Technologist
   _____Administrative Technologist
   _____Program Director
   _____University Instructor
   _____Other (please identify)

   _____

3. Medical Technologists should receive some training in the planning, implementing, and evaluating of instruction and learning during their undergraduate education.

   _____Strongly Agree
   _____Agree
   _____Disagree
   _____Strongly Disagree

   IF YOU DO NOT AGREE WITH THE ABOVE STATEMENT, PLEASE CONTINUE WITH QUESTION NO. 5.

4. Concepts in planning, implementing and evaluating instruction and learning should be taught at which level:

   _____Institution of Higher Learning
   _____Hospital School of Medical Technology
   _____Neither
   _____Both

5. Training in the planning, implementing and evaluating concepts should be:

   _____Optional
   _____Mandatory

6. In this institution students in the Medical Technology Program are now being taught concepts in the planning, implementing and evaluating of instruction and learning.

   _____Yes
   _____No

7. If your answer to question No. 6 was Yes, which of the following instructional skills are included in your Medical Technology Program:

   _____Planning Instruction
   - _____Determining Learning Goals
   - _____Reducing Learning Goals to Specific Learning Outcomes
   - _____Writing Clearly Defined Objectives
   - _____Designing/Selecting Learning Experiences
   - _____Designing/Selecting Evaluation Devices
   - _____Planning for Large Group Instruction
   - _____Planning for Small Group Instruction
   - _____Planning for Individual Instruction

   Other:_____

   _____Implementing Instruction
   - _____Applying Learning Principles
   - _____Interacting With Learners
   - _____Conducting Large Group Work
   - _____Conducting Small Group Work
   - _____Providing Individual Instruction

   Other:_____

   _____Evaluating Learning
   - _____Gathering Data for Evaluation
   - _____Organizing Data for Evaluation
   - _____Analyzing Data for Evaluation
   - _____Reporting Results

_____Evaluating Instruction

_____Gathering Data for Evaluation
_____Organizing Data for Evaluation
_____Analyzing Data for Evaluation
_____Reporting Results
_____Using Results to Modify Instruction

8. Which of the following instructional skills do you feel should be required for Medical Technologists:

_____Planning Instruction

_____Determining Learning Goals
_____Reducing Learning Goals to Specific Learning Outcomes
_____Writing Clearly Defined Objectives
_____Designing/Selecting Evaluation Devices
_____Designing/Selecting Learning Experiences
_____Planning for Large Group Instruction
_____Planning for Small Group Instruction
_____Planning for Individual Instruction

Other:_____

_____Implementing Instruction

_____Applying Learning Principles
_____Interacting With Learners
_____Conducting Large Group Work
_____Conducting Small Group Work
_____Providing Individual Instruction

Other:_____

_____Evaluating Learning

_____Gathering Data for Evaluation
_____Organizing Data for Evaluation
_____Analyzing Data for Evaluation
_____Reporting Results

_____Evaluating Instruction

_____Gathering Data for Evaluation
_____Organizing Data for Evaluation
_____Analyzing Data for Evaluation
_____Reporting Results
_____Using Results to Modify Instruction

9. The most practical way for students to receive this training would be:

_____Courses through an institution of higher learning
_____Courses through a hospital school program
_____35mm slide/cassette tape self-teaching units
_____Other:
_____

10. If 35mm slide/cassette tape units were available for use, do you feel that institutions would make use of them:

_____Yes
_____No

11. If your answer to question No. 10 was No, what would be the reason for <u>not</u> using such a unit:

_____Lack of equipment, eg. a tape player or a slide projector
_____Lack of interest
_____Not necessary for students to know this
_____Other:
_____

THE FOLLOWING QUESTIONS NOS. 12-17 ARE TO BE COMPLETED BY HOSPITAL PERSONNEL. OTHER RESPONDENTS PLEASE TURN TO PAGE NO. 3.

12. Medical Technologists, Medical Laboratory Technicians, and Clinical Laboratory Assistants receive the majority of their hospital training from Medical Technologists.

_____Yes
_____No

13. Most Hospital Instructors you know <u>have</u> received some additional training in instructional skills in order to better help their students to learn:

_____Yes
_____No

14. Most Hospital Instructors you know <u>have</u> received at least a Master's degree in education or a MSMT degree with a specialization in education:

_____Yes
_____No

15. Individuals in your Medical Technology Program that <u>have</u> <u>had</u> additional training skills are : (more than one may apply)

_____Educational Coordinator
_____Didactic Instructors (presenters of theory)
_____Bench (practical) Instructors
_____None

16. The closest university which would serve your needs for continuing education in instructional skills is:

_____Within your city
_____Within commuting distance
_____Outside commuting distance

17. If your hospital is located away from a university setting, would you be interested in some other means of learning instructional skills:

_____Yes
_____No

THANK YOU FOR RESPONDING TO THIS QUESTIONNAIRE WITH YOUR VIEWS AND OPINIONS. YOUR PROMPT REPLY WILL BE MOST CERTAINLY APPRECIATED. ALL RESPONSES WILL BE HELD IN STRICT CONFIDENCE.

IF YOU WOULD LIKE TO RECEIVE A COPY OF THE RESULTS OF THIS SURVEY, PLEASE FILL OUT THE FOLLOWING SECTION:

Name_____

Address_____

_____

_____

ANY FURTHER COMMENT?_____

_____

_____

Thomas H. Olson MT (ASCP)
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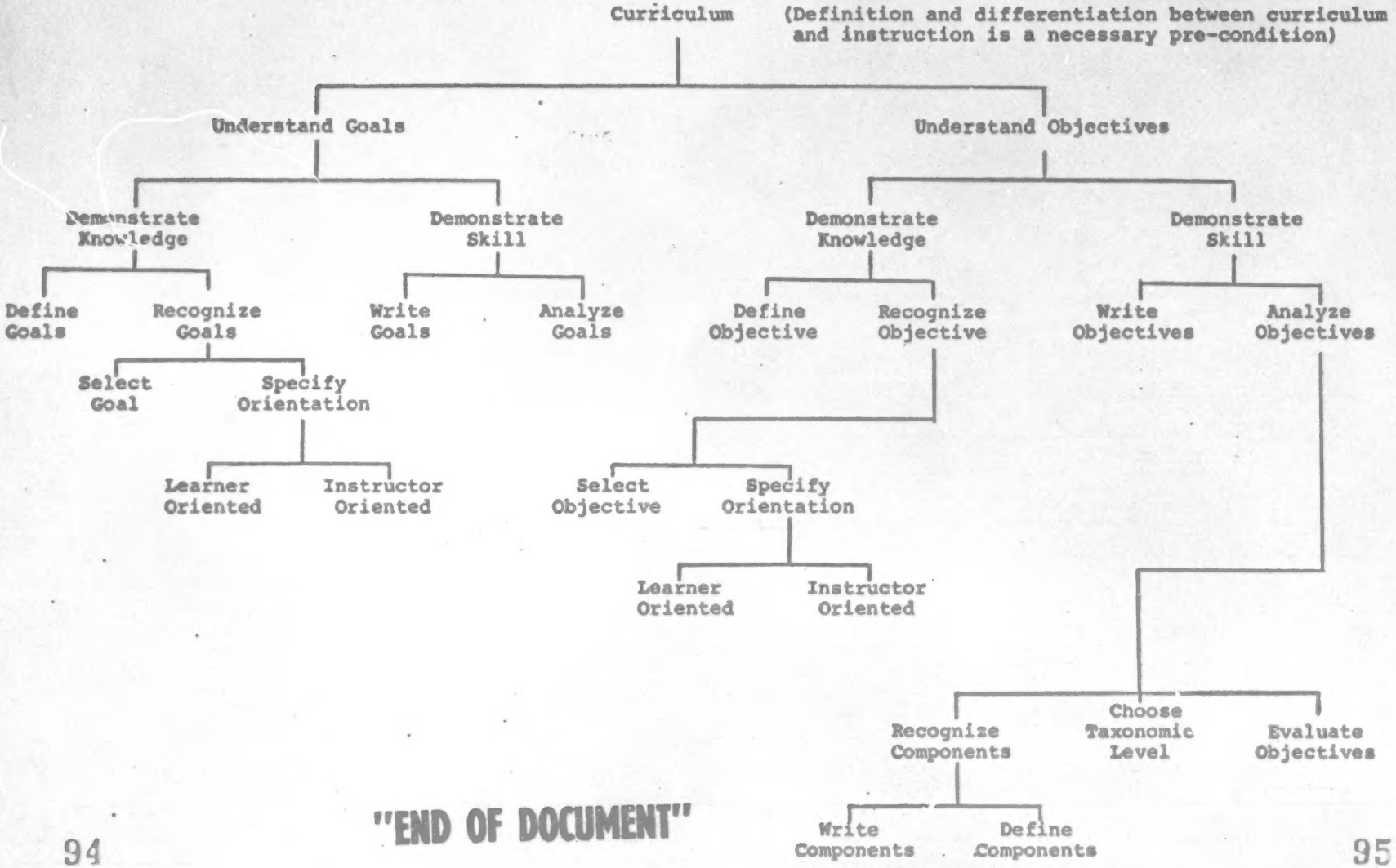
University of WI - Eau Claire
Eau Claire, WI 54701

APPENDIX D

THE LEARNER SHALL UNDERSTAND HOW TO DEVELOP CURRICULUM



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